

G E D D I N G S (W. H.)

A I K E N

AS A

HEALTH STATION.

BY

W. H. GEDDINGS, M. D.,

OF AIKEN, S. C.,

MEMBER OF THE MEDICAL ASSOCIATION OF SOUTH CAROLINA, AMERICAN
MEDICAL ASSOCIATION, AND OF OTHER MEDICAL SOCIETIES.

*[Reprinted in part from the Charleston Medical and
Surgical Journal.]*



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Physicians desiring more general information in regard to Aiken, for their patients, are respectfully referred to

“AIKEN AS A HEALTH RESORT,”

a copy of which will be furnished on application.

AIKEN AS A HEALTH STATION.

A CONTRIBUTION TO MEDICAL CLIMATOLOGY,

BY

W. H. GEDDINGS, M. D., AIKEN, S. C.

Reprinted in part from the Charleston Medical and Surgical Journal.

Few branches of therapeutics are less understood, and no article of the *materia medica* is prescribed more empirically than climate. From the time that the great physician of Cos published his renowned treatise on "air, water, and locality," much has been written on climate; but it has been only in comparatively recent times that an effort has been made to adapt its many varieties to the treatment of those diseases in which they are especially indicated. The time, we trust, has arrived when the patient will demand of his physician something more definite—not to say more rational—than the mandate to go South. That section is very extensive, and possesses many climates, differing widely among themselves, with peculiarities as marked as those which distinguish New York from Newfoundland. In that vast tract there are resorts varying in height from a few feet above the sea level to several thousand; dry, cold, and bracing resorts, with a winter mean of 38° F.; and others, moist, warm, and relaxing; mountain climates; insular climates, and other varieties too numerous to mention. The illness of a member of the writer's family compelled him, some seven or eight years ago, to seek a home in this region, and having selected Aiken as a place of residence, he has made its climate a special study. For the past five years he has made tri-daily observations with improved meteorological instruments, following rigidly the instructions furnished by the Smithsonian Institution, and United States Signal Service. In the following pages he proposes to give the result of his labors, trusting that they may aid his brother practitioners in selecting a winter home for such of their patients as they may determine to send South.

Our knowledge of the mode of action of even the most generally employed articles of the *materia medica* is at best but limited, and the achievements in that important branch

of medicine sink into insignificance when compared with the brilliant discoveries which have marked the progress of modern physiology and pathology. Nevertheless, much has been done; an immense mass of worthless material has been swept away; and the polypharmacy of our forefathers, who frequently combined fifty or more ingredients in a single prescription, has given place to a more rational system. The modern physician prefers to pin his faith to a few articles with the action of which he is familiar, appreciating to its fullest extent the value of the safe old maxim, "*nil nocere.*" Diminishing faith in the power of drugs to cope with chronic diseases has caused us to seek other and more reliable agents; and the growing interest which is everywhere manifested in medical climatology augurs a glorious future for that hitherto neglected step-child of modern therapeutics. Climate is a complex affair, and may be aptly compared to a medical preparation composed of several drugs. Before prescribing it, the intelligent physician will desire to know not only its component parts, but also the dose of each ingredient. Each climate is indeed a separate prescription, and in the following pages we shall devote ourselves to one of them, *i. e.*, the climate of Aiken, or more rationally expressed, the climate of the Sand Hills of South Carolina, giving a full and correct account of each of the factors which compose it. These factors are, *external configuration of the earth, temperature, humidity, rain, barometric pressure, winds, electricity, sunshine and ozone.*

EXTERNAL CONFIGURATION OF THE EARTH.

The first of these factors, the external configuration of the earth, aside from its influence upon various other climatic phenomena, is all important as it involves the question of altitude in the treatment of consumption and other chronic diseases of the lungs—a consideration which has of late years attracted increased attention. The theory upon which those who advocate altitude base its claims is certainly most attractive and plausible, and there is no doubt that vast numbers are annually benefited by a residence in Colorado, on the high plateaux of Mexico, or even nearer home, at Asheville, N. C. The exact height which has been found to act beneficially varies, as we approach the equator, from 1,500 to 2,000 feet in our latitude, to 5,000 and more in the Andes. Aiken is not more than 600 feet above the sea, and, at that slight degree of elevation, the effects of diminished pressure are scarcely perceptible; but its being so much

higher than the surrounding country ensures good drainage, as well as complete exemption from malaria.

The soil of Aiken is composed of loose sand, white on the surface, but of every conceivable hue as we pass through the different strata. It contains clay in varying proportions, from the slightest admixture of alumina to the compact white kaolin, which is said to equal that from which the celebrated Staffordshire ware is made. The natural drainage resulting from the location of the town on the brow of a hill is materially facilitated by the great porosity of the soil, through which the water is rapidly filtered, so that even after a heavy fall of rain the invalid is seldom confined to the house for any considerable length of time. This is a feature of no little importance to those to whom "every moment spent indoors is a moment lost." This sandy soil is a good absorbent of moisture, and thus contributes to the dryness of the surrounding air. It is sufficiently coarse and heavy not to be annoying as dust, except during an extraordinarily strong wind. The forests, which extend from the town in various directions, are important in a climatological point of view, as affording protection against winds, and influencing the rainfall. They consist, for the most part, of two species of pine, the short and the long leaved, *Pinus Australis* and *P. taeda*, and several varieties of oak—*Quercus falcata* *Q. nigr. et al.*

TEMPERATURE.

Of all the phenomena of climate, temperature is justly esteemed the most important; nor is this to be wondered at when we reflect that all the other factors are more or less dependent upon, or modified by it. The great aim and object of climatic treatment has always been the cure of consumption, and with every change of doctrine in regard to the nature and pathology of that disease, there has been a corresponding modification of opinion in regard to the kind of climate best adapted to its treatment. Indeed, during the first decades of the present century, influenced by the theories of Broussais regarding the inflammatory nature of this disease, warmth was almost the only factor taken into consideration; mild insular climates like that of Madeira were the only ones sought after. It, however, soon became apparent to many that these warm, sedative climates, instead of curing the disease, tended only in many cases to hasten the fatal termination; and a violent reaction set in, which culminated in our own land a few years since in the selection of Minnesota as a winter sanatorium for consumptives. A more

thorough and correct knowledge of the pathology of consumption, and greater familiarity with the effects of different climates, show that both were to some extent right, and that the error lay in using climate as a sort of "cure all" nostrum, and in losing sight of the important fact, that climatic treatment to be successful must be made to meet the indications in each individual case and stage of disease. In chronic diseases of the chest, it is all-important to remember that it is the great heat producing organ that is involved, and, that in measuring the amount of heat required in a given case, due allowance must be made for this deficiency, and no preconceived ideas concerning the asthenic nature of this disease should be permitted to seduce us into sending a poor anæmic invalid to freeze amid the snows of an Alpine climate. The medical profession seem now inclined to adopt as their motto, "*Medio tutissimus ibis*," and even those who are prepossessed in favor of altitude, the soundness of which theory we are by no means inclined to question, admit that as a rule it is safer for their patients to winter in a moderately cool, tonic climate, like that of Aiken or the Riviera, than to expose them to the fearful vicissitudes of a mountain winter. Madden states in his work on the climates of Europe, that twenty years ago the great majority of consumptives when sent abroad were recommended to visit "sedative, humid, warm climates, such as Madeira, Rome, or Pisa; but that now nine-tenths of such cases are sent to winter on the Riviera, at Nice, Mentone, San Remo, or in Malaga or Upper Egypt, all dry, warm, tonic climates."

Of all the figures of temperature, that representing the annual mean is perhaps the least important in forming an estimate of the comparative merits of different health resorts; Aiken (62.50°) for instance, is on the same isothermal line as Cadiz (62°), and Palermo (62.70°); but should any one, guided by these figures alone, visit Aiken during the colder season, expecting to find there the balmy air and luxurious vegetation of those semi-tropical regions, he would be most grievously disappointed, the difference between the winter mean of these places being at least five degrees. The winter mean (November, December, January,) of the three daily observations, taken at 7 A. M., 2 P. M. and 9 P. M., is at Aiken 48.53° , or one and a half a degree lower than Nice (50°), six and a half degrees higher than Pau (42°), and one and a half degrees lower than Cannes (50°) and Mentone (50°),*

*The temperature of these Foreign resorts is from Madden's Health Resorts of Europe and Africa, London, 1876.

showing a marked correspondence as to winter temperature with the world-renowned sanatoria of the Riviera.

For the sake of comparison we give below the winter temperature of several stations in different parts of the United States, taken from the U. S. Signal Service Reports, for 1874:

Boston	30.37	or	18.11°	colder than Aiken.
New York.....	36.50	or	12.03°	" " "
Chicago.....	31.63	or	16.90°	" " "
Cincinnati.....	39.60	or	8.93°	" " "
Colorado Springs ..	31.20	or	17.33°	" " "
Asheville, N. C.*.....	40.60	or	7.93°	" " "
Jacksonville.....	57.00	or	8.47°	warmer " "

The Spring (February, March, and April) gives a mean of 55°, corresponding exactly with that of Nice for the same period, and three degrees higher than that of Mentone.

The mean temperature of Aiken for the spring being 55° F.				
That of Boston is.....	34.20	or	20.80°	colder than Aiken.
That of New York is.....	37.10	or	17.90°	" " "
That of Chicago is.....	35.50	or	19.50°	" " "
That of Cincinnati is.....	43.53	or	11.47°	" " "
That of Colorado Springs is.....	32.83	or	22.17°	" " "
That of Asheville N. C., is.....	45.93	or	9.07°	" " "
That of Jacksonville, Fla., is.....	65.13	or	10.13°	warmer " "

The mean of the three summer months is 75°, or six degrees warmer than New York. The average temperature for the autumn at Aiken is 71°; a high figure, which fails to convey a fair idea of the fall season, the mean of August, (76°) which more properly belongs to the summer, being included. Deducting the latter we have as the mean of September and October 68° F.

Points of much greater importance than the mean temperature are the annual and daily extremes of heat and cold, and the rapidity with which these changes of temperature occur; but even here we must remind the reader that this after all is only a single element, and, taken of itself, fails to convey a correct idea of the worth of any individual climate. In all dry climates these variations of temperature are considerable, and Aiken is of course no exception to the rule that "wherever the air is dry, we are liable to daily extremes of temperature. By day in such places the sun heat reaches the earth unimpeded, and renders the maximum high; by night, on the other hand, the earth's heat escapes unhindered into space and renders the minimum low. Hence the difference between the maximum and minimum is greater where the air is driest." (Tyndall.) The desert of Sahara, which has per-

*E. Aston, Climatotherapy. S. E. Chaille, M. D.

haps one of the driest climates in the world, the mean relative humidity being 28° , is excelled by few in point of variability, the thermometer during the night frequently falling to 32° after having stood in the afternoon at 86° .

According to Lorenz and Rothe, the greatest extremes of temperature ever recorded were $+129^{\circ}$ F. at Macquaire in Australia -64° at Fort Reliance, a difference of nearly two hundred degrees. In addition to the influence of humidity, the variations of temperature are also affected by geographical position, the differences being greater as we recede from the equator. As examples of which, we mention on the above excellent authority that the range between the mean of the coldest and warmest month, which at Lommewyn in Guiana amounts to less than two degrees Fahrenheit, increases at Jakuzk, in the polar region, to one hundred and sixty-nine degrees. On our own Continent we find that at Key West this difference between the mean of the coldest and warmest month is fifteen and a half, and that it becomes greater the farther North we proceed, being twenty-six at Jacksonville, thirty-four at Aiken, and forty-two at New York.

The average diurnal range, or the mean of the difference between the lowest and highest temperature of every day in the year, is at Aiken 12.65° ,* which is a low figure for a climate as dry as that of North America, and represents, as we shall presently prove, a degree of equability seldom met with at any health station North of Key West.

Table showing the Mean of the Diurnal Range of Temperature.

1873.	Santa Barbara.	Aiken.
January.....	17.09	12.96
February....	12.85	10.92
March.....	13.10	13.45
April.....	12.30	15.66
September†	12.47	10.46
October....	14.13	14.19
November..	14.10	12.45
December..	13.08	13.00
Mean of Difference.	13.74	12.88

Santa Barbara, Cal., is the only health resort of importance for which we possess a complete set of thermometric observations for each day extending over a whole year. They were taken by Dr. Dimmick, at 7 A. M., 2 P. M., and 9 P. M. Comparing them with our own observations at Aiken for the same period, and taken at similar hours, we find that the mean of the diurnal range at Santa Barbara is a little less than one degree greater than at Aiken.

In the following table we give the mean of the difference between the highest and lowest temperature recorded by

*This figure represents the difference between the highest and lowest observation, taken at 7 A. M., 2 P. M., and 9 P. M., and, in this instance, not the range of the maximum and minimum thermometer.

†Here, as elsewhere in this paper, the comparison between the summer months is omitted as possessing no interest to the invalid.

maximum and minimum thermometers, and it is designed to show at a glance the relative equability of Aiken as compared with that of some of the most important health resorts of the United States. It is calculated from reports on file at the office of the Chief Signal Officer, U. S. A., Washington, D. C.:

Table Comparing the Mean of Variation in Twenty-four hours at Aiken, with that at other Health Resorts. Compiled by Dr. T. G. Croft.

HEALTH RESORTS.	September.	October..	November	December.	January.	February.	March
Key West.....	10.00	8.87	8.43	8.54	8.95	9.83	9.18
San Diego.....	12.00	12.77	14.30	17.16	12.93	12.67	15.19
Aiken.....	10.03	17.03	18.26	18.06	12.45	19.14	17.64
Jacksonville.....	15.00	19.38	15.76	19.22	14.54	18.60	20.32
San Antonio.....	14.36	25.33	23.15	21.33	22.22	22.05	16.46
St. Paul.. ..	19.00	16.41	14.46	17.61	20.09	20.82	19.00
Colorado Springs..	28.50	24.22	27.85	26.98	31.87	24.28	25.22

It will thus be seen that in point of equability, Aiken, although far from being perfect, is unsurpassed by but one health resort of importance, viz: San Diego. A comparison with the resorts of Europe is not so favorable, a fact, which is in some measure attributable to the greater humidity of these stations, possibly also to the observations being taken with ordinary thermometers, and not, as with us, with self-registering instruments, which give the range for the whole twenty-four hours. Madden states that at Pau he has known the thermometer to vary 20° in three hours. Funchel, on the Island of Madeira, has a winter and spring range of 15° , which is 2° less than that of Aiken. In the excessively dry climate of Upper Egypt the average variation for the same period is 30° . Medical writers on consumption are far from agreeing in their estimate of equability of climate in the treatment of that disease, many authorities boldly declaring that variability within reasonable limits is not only innocuous, but in many instances essential to the welfare of their patients, e. g., Fuller says: "Careful observation, amply corroborated by statistical records, proves incontestibly that the pure air of Heaven which God has provided for us to breathe, and the *variations of temperature*, to which, in His all-wise providence, He has seen fit to subject us, are not so noxious or productive of ill health as a man in his ignorance has oftentimes asserted. No climate is more variable than ours

(England) and none certainly is more healthy, as proved beyond dispute by the bills of mortality."*

In the Kirghis Steppes, the transitions from heat to cold are not only frequent, but also very abrupt, and yet that region enjoys complete immunity from consumption. In Sweden, where one-quarter of the deaths are due to diseases of the respiratory organs, Bergman, after careful investigation, discovered that the number of cases of pneumonia and bronchitis was always greatest in those months in which the variation of temperature was least marked. Guided by the results obtained from the above tables, we would therefore class the climate of Aiken as one of the most equable on the North American Continent, bearing in mind that they are all more or less variable.

HUMIDITY.

In addition to its fixed elements, oxygen and nitrogen, the atmosphere contains a certain amount of aqueous vapor, increasing or diminishing with every change of temperature, and also modified as to quantity by the configuration of the earth's surface, the proximity of large bodies of water, and by geographical position. Light and heat emanate from the sun, but vapor is a product of the earth itself. The air acting upon the water, whether in the shape of oceans, rivers, lakes, etc., or contained in the soil itself, converts a portion of it into vapor. This vapor coming in contact with colder currents of air, is, as is well known, condensed, forming fogs, clouds, etc., and is eventually returned to the earth as rain. A most striking example of this process is afforded by the evaporation of the Atlantic Ocean under the influence of the trade-winds blowing across it the hot air of the African Deserts. This immense amount of vapor on reaching the cooler air of the high mountains of the South American Continent, is condensed into water, which goes to form the Amazon and Orinoco Rivers.

The term *Relative Humidity* represents the amount of water contained in the air at a given temperature, and is now usually determined by what is known as the psychrometer, an instrument invented by August of Berlin, and extensively used by the Signal Service in this country. When the atmosphere contains as much water as it is capable of holding it is said to be saturated, and this condition is denoted by one hundred per cent., half saturated by fifty per cent., and so on, the

*Fuller on the Lungs and Air Passages, page 366.

figures representing the per centage of relative humidity. A climate is popularly said to be moist when the dews are heavy, fogs frequent; when salt melts readily on exposure; when the vapor condenses on the walls; when steel or iron utensils quickly rust; where mould forms rapidly; where mosses flourish, and where, owing to slow evaporation, the perspiration remains for a long time on the skin. A dry climate, on the other hand, is characterized by the rapid drying of clothing, absence of mould, mosses etc.; by the dessication of meats and their slower decomposition; stiffness and brittleness of the hair and beard, etc.

In estimating climates according to their humidity, Vivenot* adopts the following classification :

1. Dry Climates, $\left. \begin{array}{l} a \} \text{Excessively dry, } 1-55\% \text{ relative humidity.} \\ b \} \text{Moderately dry, } 56-70\% \text{ relative "} \end{array} \right\}$
2. Moist Climates, $\left. \begin{array}{l} a \} \text{Moderately moist, } 71-85\% \text{ relative "} \\ b \} \text{Excessively moist, } 86-100\% \text{ relative "} \end{array} \right\}$

The mean of relative humidity at Aiken being 64.04, that place, according to this table, would rank as only moderately dry, but tested by the more popular signs above mentioned, it would be considered *very* dry. Steel instruments may be exposed for months without rusting, and we have never known matches to miss fire from softening of the ends, even when left in unheated rooms. Kid gloves never spot, and boots and shoes are seldom covered with mould. Another proof of the dryness of the air is afforded by the frisure of women's hair, the crimps and curls retaining their form for days. The gray tree moss *Tillandsia*, which adds so much to the sombre grandeur of the Southern forests, and which is an unfailling sign of moisture, and often, too, of malaria, does not exist in the neighborhood, notwithstanding the fact that various attempts have been made from time to time to cultivate it.

Relying on the absence of these signs of moisture, we were greatly surprised at not finding a much lower percentage of relative humidity; but a more extended acquaintance with the meteorology of other stations soon convinced us that Aiken was not peculiar in this respect. Prague, in the centre of Bohemia, and Palermo, on the sea coast, have both a mean relative humidity of 72 per cent., and certainly no one would consider the climate of these two places as equally dry. Observations of relative humidity have never been generally

*Rudolph v. Vivenot, Ueber die Messung der Luftfeuchtigkeit. Schmidt's Jahrbucher Band 132 s 248.

taken, and data for comparison are consequently difficult to obtain. We present below a comparative table showing the degree of humidity for every month in the year for three well known Southern resorts:

Mean, Maximum, and Minimum of Relative Humidity.

MONTH AND YEAR.	Aiken, S. C.			Asheville, N. C.			Jacksonville, Fla.		
	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.	Mean.	Maximum.	Minimum.
January, 1876.	61.80	91.20	16.40	61.06	88.05	36.01	67.08	94.00	23.00
February, 1876.....	64.30	94.10	19.30	62.00	93.01	36.05	70.04	94.00	10.00
March, 1876	51.80	91.40	13.20	56.00	89.02	25.05	60.02	95.00	19.00
April, 1876..	55.80	96.20	17.90	58.01	86.01	35.08	67.00	94.00	20.00
May, 1875.....	61.70	94.70	32.00	*72.03	91.00	43.03	65.03	90.00	31.00
June, 1875.....	68.40	95.00	32.40	*76.08	96.06	58.00	68.06	95.00	29.00
July, 1875	67.10	65.00	41.80	*82.05	97.00	71.06	63.05	90.00	26.00
August, 1875.....	79.50	95.00	41.80	81.07	95.01	71.08	75.07	95.00	40.00
September, 1875.....	69.50	94.80	39.70	79.08	97.00	67.01	74.08	95.00	34.00
October, 1875.....	63.20	97.30	10.60	64.00	87.08	31.03	73.04	95.00	26.00
November, 1875.....	71.20	96.70	21.90	72.03	93.03	41.06	78.09	95.00	23.00
December, 1875.....	68.90	97.10	4.20	74.05	93.00	27.06	71.01	94.00	19.00
Mean.....	64.04			70.10			69.72		

It was found to be impossible to obtain observations for the three stations for the same year, except in the cases of Aiken and Jacksonville, both of which are from reports on file at the office of the Chief Signal Officer, U. S. A. The Asheville observations were kindly furnished by Dr. W. Gleitsmann, in charge of the Mountain Sanatorium at that place.

The annexed table embraces all the information we have been able to gather from the extensive literature at our command in regard to the hygrometric condition of the various foreign health stations.

*The observations for May, June, and July, at Asheville, were made in 1876, and not in 1875, as at the other stations.

Table Comparing the Relative Humidity of Aiken with that of European and other Foreign Health Resorts.

		AUTHORITIES.			
Aiken.....	64.04 %.				
St. Remo.....	65.	or .05	greater	than Aiken...	Biermann.
Mentone.....	70.	" 5.96	"	"	Stiege.
Nice.....	71.	" 6.96	"	"	Biermann.
Hyeres.....	58.	" 6.04	less	"	Biermann.
Cannes.....	62.	" 2.04	"	"	Biermann.
Palermo.....	73.	" 8.96	greater	"	Tacchini.
Madeira.....	73.9	" 9.86	"	"	Schultze.
Riviera (da Ponente) 70.		" 5.96	greater	than Aiken,	
					Hirschfeld & Pichler.

This table shows that Aiken is dryer than either of the above mentioned stations, except Hyeres and Cannes, and in these instances the dryness is undoubtedly increased by the frequent prevalence of the baneful mistral, with which the invalid emigrant would gladly part, even at the sacrifice of a considerable per centage of dryness.

PRECIPITATION.

The air is never absolutely dry, and even in the most arid regions it always contains a small amount of moisture, a fact which may readily be demonstrated by exposing chloride of calcium and other substances, which possess in a high degree the property of absorbing the watery elements of the atmosphere. By noting the difference between their weight before and after the experiment, we are in a rough manner enabled to estimate the amount of moisture present in the air. Where does this ever-present-water come from? Its source is the earth itself, three-fourths of its surface being covered by water in the form of oceans, lakes, rivers, &c. These immense bodies of water undergo constant evaporation, the amount converted into vapor varying with the geographical position of the water, the season of the year, the period of the day, and the quantity of aqueous vapor already present in the air.

Every object in nature which contains water is subject to this law, the soil itself and the plants which grow upon it, all contribute their share, the solid ice forming no exception to this general rule. The quantity of water which is thus converted into vapor in the course of the year amounts, at Cumano, in South America, to a layer 35.20 millimeters in thickness. (Mohn.) The water thus received into the atmosphere remains, under ordinary conditions, invisible, but may

at any moment assume a visible form, and be converted into clouds, fogs, rain, dew, or some of the other products of condensation, which meteorologists term collectively *precipitation*.

As explained when treating of relative humidity, the quantity of water which the atmosphere can hold depends upon its temperature, warm air being able to take up a much larger quantity than cold; thus if the temperature be 59° F., it can hold water to the extent 1-56 of its whole volume, while at 32° F. its utmost capacity would be but 1-150th part. A space, say a room, measuring 10,000 cubic feet, would be capable of holding at 59° F. 13 7-10 ounces of vapor, while at 32° F. it would be able to accommodate only 5 7-10 ounces. (Drechsler.) Air thus charged to its fullest capacity is said to be in a state of saturation, and any lowering of temperature will cause its aqueous vapor to be condensed into what until lately has been supposed to be minute vesicles, but which Von Obermeyer now pronounces to be exceedingly fine drops; these again, in their turn, are reconverted into invisible vapor as soon as the temperature rises sufficiently to take up that amount of moisture. All the various forms of precipitation are in accordance with this general law, a knowledge of which is essential to a proper understanding of the various forms of water met with in the atmosphere. These latter are: 1. Dew or Frost. 2. Fogs or Clouds. 3. Rain or Snow. 4. Snow or Hail.

DEW OR FROST.

1. *Dew*.—If a cold object be exposed to the action of warm air, the temperature of the latter is lowered, and its aqueous vapor is deposited upon the surface of the solid body in the form of minute drops of water. Again, if the temperature of water in a glass on a warm day be reduced by the addition of ice, moisture will soon be deposited on its outer surface, and the degree of heat at which this takes place is termed the *temperature of the dew point*. Applying the same to the atmosphere, we find that the disappearance of the sun beneath the horizon is followed by a more or less rapid radiation of heat, and the earth's surface becoming cooler, causes condensation of the vapor immediately above it, the water thus formed being deposited in minute drops, constituting the familiar phenomenon known as *dew*. With one or two rare exceptions, dew is never deposited except at night, the radiation of heat during the day being more than counterbalanced by the heat evolved from the sun. Anything that impedes the radiation of terrestrial heat will prevent the

formation of dew; hence it is never observed on cloudy nights, the heat radiated from the earth being reflected back by the clouds. Another essential condition for the deposit of dew is a comparatively still atmosphere, in order that the strata of air immediately above the earth's surface may be reduced to the temperature of the dew point. If waisted away by the wind before it is sufficiently cooled, it is immediately replaced by the air of higher temperature, which too, in its turn, is carried away before condensation can take place. In addition to unimpeded radiation and the absence of wind, there is a third condition necessary to the formation of dew, *i. e.* a certain amount of moisture in the air itself, without which of course no condensation is possible; as for example, in some of the sandy deserts of Africa, over portions of which no dew whatever is formed. The quantity deposited depends upon the amount of vapor present in the atmosphere, being very great in moist localities. The exact amount deposited has rarely been measured, the apparatus devised for that purpose being all more or less imperfect, so that our estimates of the quantity deposited are only comparative in their character. When the temperature of the dew point is at 32° F. or lower, the moisture of the atmosphere is deposited in a solid form, known as *frost*. Frost is not, as is often erroneously stated, frozen dew, but a deposit of icy particles, which are congealed prior to their precipitation. It should be remembered that, owing to radiation, the temperature immediately above the ground is some ten or more degrees lower than that measured at an elevation of ten or fifteen feet, and that, consequently, frost may form when a thermometer in the latter situation does not register less than 45° F. Mohn suggests that this fact may be turned to practical account in determining the likelihood of frost.* If, at the observation taken at 9 P. M., the temperature of the dew point is lower than 32° F., then frost will take the place of dew. In making the above observation, the conditions requisite for the formation of dew must, of course, be present, and the wet and dry bulb thermometer used to determine the dew point should be exposed near the earth's surface. At Aiken, as would naturally be expected from the dryness of the atmosphere, the amount of vapor precipitated in the form of dew is relatively insignificant, and during a residence extending over a period of eight years, we have never witnessed what would, in most localities, be denominated as a heavy

* Grundzuege der Meteorologie. H. Mohn. Berlin, 1875. Page 147

deposit of dew. During the warmer months of the year the inhabitants pass the greater portion of the time out of doors, some of them even sleeping in the open air with no shelter over them, without experiencing any ill effects, as proven by the extreme rarity of rheumatic affections, and acute diseases of the air passages at that season of the year. We know of a lady from one of the New England States, far advanced in consumption, who left her comfortable boarding house in town for a dilapidated shanty in the country, on the open piazza of which she slept during the greater portion of the month of March, 1877, without in any way suffering from the long continued exposure to the night air.

Frosts are not very frequent even during midwinter, and seldom occur more than once or twice after the third week of March.

In 1873 the latest frost was on April the 26th; in 1874, on March 14th; 1875, April 18th; 1876, March 29th, and in 1877, March 22d. Aside from the injury they do vegetation, they may practically be said to be over after the middle of March.

FOGS AND CLOUDS.

Clouds, like all the other forms of water in the atmosphere, result from the condensation of the moisture arising from the earth in the form of vapor. This being warm and light, naturally ascends, until meeting with the colder strata of air in the upper regions of the atmosphere its temperature is reduced, and with it its capacity for holding moisture in the form of invisible vapor; it reaches the point of saturation and is condensed into minute globules, which, when massed together, form the different varieties of clouds with which we are all so familiar. The formation of clouds, as we see, resembles that of dew, except that the one is deposited on solid bodies, and that the other is condensed in the atmosphere itself. Clouds are frequently formed by the mixture of two currents of air of different temperature, in which case condensation takes place in the same manner as when an ascending warm current meets with a colder one. "Let us suppose that two strata of air meet and become mixed, the one at a temperature of 77° F. and the other at only 54.50 F., assuming both to be alike as to quantity, we obtain as the result of the mixture a temperature of 65.75° F. The two temperatures, 77° and 54.50 correspond respectively to a tension of vapor of $0.927''$ and $0.4253''$, so that the mixture of the two would give a pressure of vapor equal to $.6762''$, but as this pressure

at 65.75° F. amounts to only .6225" the excess, .0537" must assume a fluid form and hence become visible."

When the condensation takes place near the earth's surface, the product is called a fog, the latter being nothing more than a very low cloud. They are formed when a current of cool moist air passes over ground which has been heated by the sun, or when warm air is wafted over a surface which has been for some time exposed to greater or lesser degree of cold. They are frequently observed in the evening floating over rivers, lakes, or other bodies of water, the air being reduced below the point of saturation by the cold temperature of the latter.

Clouds are of course subject to the laws of gravitation, their fluid particles having a constant tendency to fall toward the earth. Their suspension at a certain height is only apparent, not real. A cloud in the act of descending reaches a body of air of a higher temperature, and consequently able to take up a greater amount of moisture; the lower border then disappears from view, its watery particles having become again converted into invisible vapor. This warm air being lighter ascends and becomes reconverted into clouds as soon as it reaches a temperature sufficiently low to condense its vapor.

In medical climatology the consideration of the average amount of cloudiness is important, for it is by its means that we are enabled to estimate the quantity of sunshine that may fall to the share of a given locality, that place being considered as most conducive to health in which the number of clear days predominate most over those which are overcast, a subject which we will consider more in detail when we come to speak of the effects of sunshine.

In the absence of any extended record of the amount of cloudiness at Aiken, we can only say from individual observation that even in mid-winter there is no scarcity of clear, bright sunshine; that fogs are rare, and that they usually occur when, after the prevalence of a low temperature, the wind changes and blows over the cold ground the warm moist air of the South. They seldom last longer than a few hours, and are soon dissipated by the warm rays of the sun.

RAIN OR SNOW.

If, from ascending into a higher region, or from coming in contact with a colder current of air, the temperature of the cloud be lowered, or if, even without any change of tempera-

ture, it is mixed with a body of air containing a large amount of aqueous vapor, condensation continues, the minute drops or icy particles become larger and fall to the earth in the form of drops of rain, or, if the temperature be sufficiently low, as flakes of snow. These drops, which at first are quite small, increase in size in passing through the lower strata of the atmosphere, partly by coalescing and partly by condensing the moisture of the air through which they pass, the drops themselves being sufficiently cold to reduce the latter below the temperature of the dew point. It may, however, happen when the air below is not only warm, but exceedingly dry, that the drops, instead of becoming larger, are reduced in size, or even disappear entirely before reaching the earth, the water becoming reconverted into invisible vapor.

The quantity of rain that falls is dependent upon the latitude of the place, its proximity to large bodies of water, its altitude, its relation to mountains and other inequalities of the earth's surface, and also varies greatly with the season of the year. The quantity of rain is greatest at the equator, where 95 inches falls in a little over two months, and decreases as we approach the poles, the total amount for the whole year being 23 inches at London, and at Stockholm only 18 inches. As examples of the enormous amount of water which sometimes falls in the tropics, we would call attention to the statement of Pick*, that 148 inches fell during one month, (June, 1851,) at Cherraponjee, and 30 inches at Gema in 24 hours, (October 25th, 1822). The presence of large bodies of water not only renders the air moister, but greatly increases the annual rain-fall; thus, New York, $40^{\circ} 43'$ north latitude, has 43.73 inches, while Dubuque, Iowa, $42^{\circ} 30'$ north latitude, has only 32.34 inches. Up to a certain height the rain-fall increases with the ascent; at Geneva, for instance, the average fall is 28.2 inches, while at the St. Bernard it is 51.5, or almost twice as much. (Lorenz and Rothe). This is due to the fact that, although the air becomes dryer as we ascend, the showers and rainy days are so much more numerous that they more than compensate for the deficient supply of moisture, the colder air of the higher situation causing more frequent precipitation. Ranges of mountains increase the rain-fall by causing the currents of air driven against them by the wind to ascend into the regions above, where, owing to the lower temperature, the moisture is readily condensed in the form of clouds and rain. Rain, in our latitude, is much more fre-

*Neber die Regenverhaeltnisse der Erd-Oberflaeche. Wien, 1865.

quent in summer than in winter, the showers being heavier and the drops larger. The light drizzling rain belongs more particularly to the winter. Rain is usually as pure as distilled water, but sometimes contains carbonic acid. Nitric acid, too, has been detected in it in small quantities, the latter being the result of the action of electricity on the oxygen and nitrogen of the atmosphere. One of the largest rain-falls on record in this country occurred in the Catskill mountains, on the 26th of July, 1819, at which time fifteen inches of rain fell in six hours.

There are large tracts of country upon which no rain whatever falls, and where vegetation is altogether dependent upon the deposit of dew for its moisture. The amount of rain-fall, whether annual or monthly, should never be relied upon in forming an estimate of the comparative dryness of a climate, as a heavy shower of half an hour's duration will frequently measure as much and even more than a fine mist, which continues falling throughout an entire day. In seeking for a dry climate, the number of days on which rain falls should, therefore, always receive more consideration than the quantity as measured by the rain gauge.

If the temperature of the clouds, at the time when condensation takes place, is at or below the freezing point, the water condensed does not assume the form of drops, but that of little crystals of ice, which, during their passage through the air, coalesce and reach the earth as snow flakes. If, at the time of their formation, the air is subject to concussion, the result of electrical phenomena, we have little needles of ice, which, increasing in size by coalescence, reach the earth as hailstones. (Bierman.)

At Aiken the average annual rain-fall, as observed during the last seventeen years, is 46.48 inches; of this, 9.02 inches falls in winter; 14.44 in spring; 12.23 in summer; and 10.79 in the fall.

The following table shows the average rain-fall for every month of the year:

January.....3.17	April.....6.04	July.....4.11	October.....3.09
February....4.38	May.....3.38	August.....4.98	November....2.64
March.....4.02	June.....4.74	September....2.72	December....3.21

It will be seen from the above that the largest proportion falls during the warmer months of the year. April has a larger amount (6.04) than any other month, and this notwithstanding the fact that it usually has a larger proportion of bright clear weather than any other period of the year. The

excess is evidently due to the frequent, and at times, heavy showers that take place at that season of the year, which, although of short duration, sometimes bring down a very large amount of water. They afford an apt illustration of the remark made above, that the amount of rain which falls is no criterion of the dryness of a given locality.

In the annexed table we present a comparison of the rain-fall at Aiken, with several important stations East of the Rocky Mountains.

Average rain-fall at Aiken is.....		46.70 inches	<i>Difference.</i>	
"	" " " " Boston.....	48.87	"	2.17 greater than Aiken.
"	" " " " New York.....	43.73	"	2.87 less than Aiken.
"	" " " " Philadelphia	49.88	"	3.18 greater than Aiken.
"	" " " " Baltimore... ..	43.18	"	3.52 less than Aiken.
"	" " " " Chicago.....	37.91	"	8.79 less than Aiken.
"	" " " " Jacksonville, Fla.....	55.93	"	9.23 greater than Aiken.
"	" " " " New Orleans.....	74.13	"	27.43 greater than Aiken.

The above is compiled from the U. S. Signal Service Reports.

This slight variation in quantity at the Northern stations is due to their being several degrees further north, and the deficiency at Chicago is attributable to its distance from the ocean. The annual rain-fall is one of the most inconstant of all meteorological phenomena, and observations extending over many years are required to estimate correctly the average annual fall. At Aiken, during sixteen years, the quantity has ranged from 33.87" in 1860 to 56.49" in 1863. In medical climatology, the duration of rain, as before stated, is of much greater importance than the quantity, a small amount distributed over a long period being much more deleterious to health than heavy showers recurring at longer intervals. Catania, a Sicilian resort of some note, has an annual rain-fall of 78 inches, and we would naturally expect there much wet weather, but on further examination we find that the whole of this amount falls within 29 to 45 days, and that of the remaining portion of the year 216 to 239 are all clear, and only 84-107 cloudy. On the other hand, at Vienna, with an annual rain-fall of only 28 inches, or a little over one-third of the quantity at Catania, there are no less than 141 rainy days.

The following figures, extracted from one of Schott's valuable Smithsonian rain tables (p. 142), and based upon observations extending over a period of from 10 to 214 years, will give the reader a correct idea of the relative frequency of rain in South Carolina, as compared with the other States east of the Mississippi:

Table comprising the number of days on which rain falls in South Carolina, with some other States east of the Mississippi.

LOCALITY.	Aggregate Years.	Days.	
Maine.....	89	93	or 4 more than South Carolina.
New Hampshire.....	15	76	or 13 less " " "
Vermont	26	89	or 00 " " "
Massachusetts & Connecticut	26	98	or 9 more than " "
Rhode Island.....	50	96	or 8 " " " "
New York.....	214	109	or 20 " " " "
New Jersey.....	12	118	or 29 " " " "
Pennsylvania.....	93	119	or 30 " " " "
Delaware, Maryland, and District of Columbia...	58	83	or 6 less " " "
Virginia.....	37	85	or 3 " " " "
North and South Carolina..	52	89	
Georgia.....	18	83	or 6 " " " "
Florida.....	77	91	or 2 more " " "
Alabama....	17	98	or 9 " " " "
Mississippi and Louisiana...	50	92	or 4 " " " "
Kentucky.....	10	89	or 00 " " "
Ohio.....	118	116	or 7 more " " "
Michigan.....	87	117	or 28 " " " "
Indiana and Illinois	10	107	or 18 " " " "
Wisconsin.....	48	89	or 00 " " "
Minnesota	47	89	or 00 " " "
Iowa.....	19	98	or 9 more " " "

From Schott's Smithsonian Rain Tables.

An analysis of the above table shows, that of the twenty-seven States represented, but six of them had fewer rainy days, five had the same, while in sixteen the number was greater than in South Carolina by from two to thirty days. The rain-fall in the States west of the Mississippi is so much modified by their distance from the Atlantic Ocean, as well as by other climatic conditions, as to render a comparison with South Carolina valueless.

Leaving the American continent, we will now institute a comparison with some of the resorts in Europe and Africa, but in so doing, beg to remind the reader that in these countries the standard of what would be called a rainy day may be different from the one in use in America, where any day on which more than 1-100 inch rain or melted snow falls, is classed as a rainy day.

Table of Days on which more than 1-100 of an Inch of Rain falls at Aiken, compared with the Number of Rainy Days at some African and European Resorts during the Colder Half of the Year, (November to April inclusive).

Name of Resort.	Number of Rainy Days.	Difference of	Authorities.
Aiken*.....	41	U. S. Signal Service.
Algiers.....	71	or 30 days more than Aiken.	Mitchell.
Nice.....	31	or 10 days less than Aiken...	Gsell-Fells.
Mentone.....	38	or 3 days less than Aiken...	Stiege.
Rome.....	65	or 24 days more than Aiken	Hirschfeld & Pichler
Palermo†.....	58	or 17 days more than Aiken.	Tacchini.
Pan.....	50	or 9 days more than Aiken.	
Madeira.....	62	or 21 days more than Aiken.	Mitttemaier.

Of the above mentioned world-renowned sanatoria, Nice is the only one at which the number of rainy days in winter is materially less than at Aiken, Mentone having very nearly the same, while at the others the number is much larger.

The amount of snow that falls at Aiken is inconsiderable, both as to quantity and duration. During the past five years we have a record of its having fallen six times, but as a rule there were only a few flakes, which melted as soon as they reached the ground. Once in a while, at long intervals, as in 1873, it has been known to cover the ground for a day or two. Sleet is more frequent than snow, but it, too, soon disappears after a few hours exposure to the sun.

The Physiological and Pathological effects of Moisture in its various forms.

Before going over to the direct effects of moisture upon man in health and disease, we must first consider its relation to the meteorological factors of climate, more especially its influence upon equability of temperature. As before stated, all dry climates are more or less variable, so that the hygrometer frequently is almost as good a gauge of the equability of a place as the thermometer. The disastrous effects of an absolutely dry atmosphere are thus graphically described by Tyndall: "Aqueous vapour is a blanket more necessary to the vegetable life of England than clothing is to man. Remove for a single summer night the aqueous vapour from the air which overspreads this country, and every plant capable of being destroyed by a freezing temperature would perish. The warmth of our fields and gardens would pour itself unrequited into space, and the sun would rise on an island held fast in the iron grip of frost."

* The Aiken figures are the average of four years.

† The number of rainy days not being given for April, we have interpolated 8.

Fortunately for the human race such an atmosphere does not exist. On man the effects of the various degrees of humidity cannot be separated. "The greater the amount of aqueous vapour in the atmosphere, in other words, the higher its *absolute* humidity, the better are its conducting properties, and the better able is it to promote the cooling of organic bodies. This proposition is however greatly modified by high temperatures, which of themselves induce and increase the production of sweat, but at the same time, owing to their greater *relative* humidity, check its evaporation, and thus prevent that cooling of the surface which would otherwise take place, hence a high degree of relative humidity acts upon the body as a cooling agent in winter, and a heating one in summer."*

Humidity also influences the renal secretions, the flow of urine being much less when the air is damp and proportionately increased when it is cold and dry. The effects of warmth combined with a high degree of humidity are to reduce the nervous energy and muscular power. The appetite is diminished, the digestion becomes impaired and there is more or less insomnia. "This corresponds with our experience in warm, moist climatic resorts, where the favorable effects of the mild, moist, and consequently more equable air on the local trouble in the lungs is more than counterbalanced by its injuriously depressing effect upon the system."† Speaking of the so-called sedative winter climates, Madden says: "That the atmosphere is not only warm, but humid, or even, as in some places, saturated with vesicular moisture. In such climates the eliminations from the skin and lungs are diminished, and the air necessarily containing less oxygen than an equal volume of dry air, the breathing is hurried, the process of respiration is less perfectly accomplished and the nervous energy and muscular power of the emigrant invalid are diminished."‡ We have every Spring opportunities of witnessing upon invalids the exhilarating effects of a removal from the moist climates of Nassau and the tropical South to the dry and invigorating air of Aiken, the change being almost always attended by a marked increase of physical strength, improved appetite, and better digestion.

With the advance of the warmth of spring there is always an increase in the humidity of the air, causing, as above

*Braun ; Balneotherapie, Berlin, 1873, pg. 56.

†Braun ; Balneotherapie, Berlin, 1873, pg. 58.

‡Madden, pg. 2.

stated, diminution in the amount of water exhaled by the skin; this being unable to escape, goes to increase the volume of the blood, and it is not improbable, as suggested by Rohden, that the congestions, hæmorrhages, etc., which are so frequent during the month of March and April, may be due to this cause. There is no doubt but that much of the diarrhœa prevailing at that period of the year may depend upon this over-distended condition of the blood vessels. That the softening and breaking down of cheezy (tubercular) infiltration is hastened by a residence in warm moist climates, has long since ceased to be a matter for dispute. Every one is familiar with the fact that a wet winter is more unhealthy than a dry one, and Gustav von Liebig has demonstrated, by statistics, that the greatest number of deaths occurs during spring when the air begins to become moist, that a damp January is followed by much sickness, and that the period of day at which persons are most liable to take cold is immediately after sunset, or just before sunrise, which corresponds to the time when the air contains its greatest amount of vapor, and the dew is most abundant. Heavy deposits of dew are a fruitful source of disease, especially rheumatism and dysentery, due not only to the rapid cooling of the ground, but also to the cold produced on the body itself by evaporation. (Muehry.)* Clouds and rainy weather, besides contributing to the above mentioned effects of moisture, are prejudicial to the well being of the invalid, by depriving him of sunshine and out-door exercise.

GENERAL CHARACTER OF THE AIKEN CLIMATE.

Having studied in detail the various phenomena which constitute what is denominated climate, and determined by meteorological observations and comparative tables to what extent they are present in the special climate, which is the subject of this article, it remains for us now to consider them as a whole, and assign to Aiken its true climatic status. We find that it is moderately cool, quite dry, slightly variable, and that it has a larger proportion of fair weather than almost any American resort east of the Rocky Mountains. Comparing it with foreign sanatoria, we note that it has the same average winter temperature as Nice, Mentone and Cannes, but with a somewhat greater range; that in point of humidity it is superior to all of them, except Hyeres and Cannes,

* Muehry Noso-Geographie, page 48. Leipsig & Heidelberg. 1856.

where the lesser percentage of moisture is in a measure due to the prevalence of the mistral. These climates are characterized by Bennet as "cool, sunny, bracing, stimulating, and dry," which are the very qualities that all intelligent writers have employed in their descriptions of the climatic characteristics of Aiken. The question which naturally arises after such a comparison is, whether the climate of Aiken is as good a one for invalids as that of the above localities, especially that of Mentone?

In point of equability and limited range of temperature, it is undoubtedly inferior to the latter places; nor do we find at Aiken that luxuriant growth of Southern plants, which are met with in that sheltered region; but, are we too bold when we claim that these advantages are counterbalanced by greater dryness, that with the same number of fair days, and a similar quantity of sunshine, the invalid is not pent up, as at Mentone, in "a narrow ledge at the foot of a mountain," but is unlimited as to the direction or extent of his walks. The contracted area at Mentone is indeed a serious objection, and in this connection we cannot refrain from extracting from Dr. Madden's *Health Resorts of Europe*, the following remarks of Sir Dominic Corrigan: "No locality that is small in extent, no matter how favorable it may seem, is desirable; for if a turn around a hill, or a different aspect at a short distance, give a considerable change of temperature, the locality is unsuitable, both on this account, and because the resident is there confined to too small a space, and body and mind suffer."

WHO SHOULD GO TO AIKEN?

The intelligent physician, who has carefully read what we have written about the climatic peculiarities of Aiken, will, we trust, find but little difficulty in determining the class of cases that should be sent there, when they should go, and how long they should remain. The climate of Aiken being tonic and bracing in its character, is naturally indicated in most chronic diseases of an asthenic type.

1. *Bronchitis*, with more or less secretion.

2. *Consumption*, in its various stages, except the last, and in all its forms, except acute tuberculosis and laryngeal phthisis.

NOTE.—We had hoped to be able to take up in detail all the factors of climate, but find that we have already far exceeded the space allowed us for this portion of our subject, and will be obliged to leave for a future occasion the consideration of pressure, winds, electricity, ozone, etc.

Some few cases in the incipient stages of the diseases, attended with troublesome, hacking cough, with little or no expectoration, may with propriety be advised to try Aiken, and in the absence of improvement, then to seek relief in the mild, sedative climates of Pilatka, St. Augustine, and Nassau.

There is an important class of cases in which much good is likely to be achieved by a residence in Aiken. We allude to persons with marked tendency to consumption, be it hereditary or acquired, in whom the disease, as yet undeveloped, hangs over the unfortunate like the sword of Damocles, ready to fall, but yet still capable of being averted by good hygienic management and a judicious change of climate. The number of cases like these is simply enormous, and the physician who, forgetting that his mission is to avert disease, as well as to cure it, sounds no note of warning, is not only derelict in duty, but guilty of negligence for which the term criminal is none too harsh. Year by year cases come under the writer's observation, where neglect on part of the physician to give this warning, or its disregard when given, has caused a sacrifice of human life which might have been prevented. It was with this view that the writer has so frequently urged the establishment at Aiken, or other similar sanatoria, of educational institutions, where, in addition to other climatic advantages, boys and girls might, throughout the whole year pass a good portion of each day in the open air.*

3. *Malarial Diseases.* Aiken, thanks to its high position, is absolutely free from malarial fever, the writer having seen, during eight years' practice there, but a single case, and that a doubtful one, which could not be traced to extraneous origin. Cases of malarial cachexia sent here from other places respond most readily to treatment, and, from personal experience, we have no hesitation in recommending the climate as a great adjuvant in the treatment of inveterate cases.

4. *Dyspepsia.* Gastric catarrh and other affections of the stomach, usually classed under the term "dyspepsia," are often benefited by a change to the invigorating atmosphere of Aiken; but in the absence of mineral springs we can see no special indication in this class of diseases. They certainly do better in a cool, bracing climate, like that of Aiken, than they would farther south, and if a change is determined upon, during the winter months, Aiken will be found as desirable as any other resort accessible at that period of the year. The

* We are preparing a resume of cases of consumption treated at Aiken, and hope to have it ready for publication some time during the present year, 1877.

increased appetite and improved digestion in the case of consumptives is not the least of the advantages derived from a residence there.

5. *Anæmia.* On theoretical principles, one would naturally expect benefit from a dry tonic air, like that of Aiken, in cases of chlorosis, and other affections, characterized by poverty of the blood, and that this is really so, is attested by the improved appearance resulting from a residence here, much of it being due to their ability to take a large amount of exercise in the pure air of the country.

6. *Diseases of Females.* This class of affections does well in Aiken, but cases complicated with severe neuralgia should, as a rule, be excepted.

7. *Diseases resulting from overwork, confinement, etc.,* frequently improve rapidly after a few weeks' residence in Aiken, and the number of them who derive no benefit from the change is quite small.

8. *Convalescents from Pneumonia and Pleuritis.* There are many cases of these diseases in which nature fails to bring about a complete cure, in which the infiltration or effusion remains unabsorbed, and where, in spite of the most skillful treatment, the patient does not improve, and where, if left to itself, the acute disease lays the foundation of a lingering, and, in all likelihood, fatal consumption. There can be no question about sending such cases South, and in by far the greater proportion of them, the indication is for a tonic-bracing climate, and not a warm and moist one.

9. *Convalescents from Typhoid Fevers and other exhausting diseases.* We believe that more good can be accomplished by change of climate in these cases than any other we have thus far mentioned, especially when, as is frequently the case, the disease leaves the patient with a troublesome cough, undefined, but suspicious in its character.

10. *Syphilis.*—Many old cases of this disease require a change during the winter, some to avoid cold, but many on account of debility and anæmia. The former should go to Florida, but the latter will do better at Aiken.

11. *Children convalescing from scarlatina, measles, and whooping-cough, others with scrofula, suppurating glands,* need the dry air of Aiken, and frequently improve there with marvelous rapidity. We are glad to find our opinion in regard to these cases confirmed by Dr. Madden. "My experience as physician to three large institutions in which the diseases of children are brought under my care, has confirmed the observation made in my first work on Climatology

several years ago, that there is no class of patients in whom we may more confidently hope for the beneficial change of air than in the case of children predisposed by the scrofulous diathesis, or by hereditary taint, to consumption. The climate chosen for the treatment of this predisposition to tubercular disease should be dry, bracing and equable."

Aiken is contra-indicated in the following diseases :

1. *Laryngeal Consumption*, the air being entirely too dry for such cases.
2. *Laryngitis*.
3. *Bronchitis*, when attended with very tight cough and sparse secretion.
4. *Bright's Disease*.—If sent South at all, these cases should winter at Nassau or Florida. Should it be desirable to send them to Aiken it should be only in the Fall or Spring.
5. *Eye Diseases*.—The glare from the white sand of Aiken will be found objectionable in these diseases.
6. *Diseases of the nervous system* must be selected with caution and in accordance with the known peculiarities of the climate.

There are two forms of disease in which the writer frankly confesses his inability to determine *beforehand*, whether or not they will derive benefit from a residence in Aiken, rheumatic affections and spasmodic bronchitis, (asthma,) many cases of both having been cured, but in other instances he has been obliged to send them farther South to warmer and moister regions. With our present knowledge, the climatic treatment of these affections is still, in a great measure, experimental.

WHEN TO GO TO AIKEN.

The time at which the invalid should go to Aiken will depend upon the object of his visit, the nature of his disease, and his physical condition. Many persons go South simply to avoid the disagreeable months of winter and spring, and are not injured by remaining at home during the autumn. For the consumptive, however, who seeks in the South not a place of refuge, but goes there to get well, we would suggest an early departure, so as to reach Aiken in time to enjoy the superb weather which usually prevails from the 1st of October to Christmas. This is at Aiken undoubtedly the finest portion of the year, with day after day of bright sunshine, the air being just cold enough to act as a gentle tonic, without chilling, or in any way adding to the discomfort of even the

most sensitive invalid. We have often regretted that comparatively so few avail themselves of this beautiful season. The winter proper is very short, commencing usually about the end of December, and extending through January and the greater part of February, during which period the air is usually clear and cold, with occasional frost, but even at this season the cold is never so great or long continued as to act injuriously upon any, except those cases which we have previously described as unfitted for this climate.

The anaemic consumptive will occasionally complain of chilliness, and with the peculiar restlessness so often met with in that disease, may, if left to his own guidance, start for Florida or Nassau, being unable to understand that the slight discomfort occasioned by the prevalence of a few days of cold weather, are more than compensated for by its invigorating effects, as evinced by improved appetite, better digestion and increased weight. We would here protest against the undue latitude, in this respect, which is allowed patients by their physicians. In more than one half the cases the medical man gives his patient the convenient advice to try Aiken, and if his health does not improve, to go farther South, losing sight of the fact that the latter is incompetent to form an opinion, and that disappointed, perhaps, because his cough has not left him, fancies that the climate is disagreeing with him, and frequently leaves at a time when it has just begun to manifest its good effects. Under such circumstances, and, in the absence of want of confidence in the resident physician, it is the plain duty of the patient to write to his medical attendant at home, detailing his symptoms, and allowing him to be the judge as to the propriety of a change. Our own experience teaches us that the number of cases requiring such change is exceedingly limited, and that, although we may frequently consent to a short trip to Nassau or Florida in mid-winter, it is more with a view to breaking up the monotony of a protracted residence than from any fear of cold weather. It is, for both sick and well, the healthiest part of the year, and the steady improvement of the former during the colder months is one of the best proofs we are able to present of the superiority of a tonic bracing climate in the treatment of consumption, over the warm, sedative ones, so much in vogue twenty years ago. Dr. Lente, of Palatka, in his admirable paper on Florida, in contrasting the alternations of temperature which characterize the winter climate of that State, and which, in his opinion, render it much less enervating than the more tropical climates of Nassau and the West Indies, thus clearly

describes the effects of long continued heat: "A continuous temperature of from 75° to 80° at mid-day, for a number of consecutive days, is generally felt as a serious inconvenience, especially by the more advanced and debilitated cases of phthisis, and these generally longed for the cold changes, knowing by experience their tonic effect; whereas, the steady heat of some tropical regions, though not excessively high, and very agreeable to most persons, is generally followed by increased debility in the spring in the case of invalids. I have watched with some anxiety the cases of those in the more advanced stages of consumption, when the diurnal temperature ranged as it did last winter, from December 5th to December 16th, as follows: 78° , 82° , 82° , 83° , 84° , 81° , 82° , 81° , 81° , 80° . As I heard them complaining from day to day, and was gratified, when the mercury showed 69° at the same hours on the 16th, to hear their expressions of relief, and to see their entire change of manner and appearance."

This applies to the winter of '75-'76, at which time the injurious effects of unseasonable heat were apparent even as far north as Aiken, but in a mitigated degree. Towards the close of February the approach of spring is announced by the blooming of the peach and other fruit trees, and from this time the heat continues to increase with the advance of the season, not continuously, but in waves, like the rising tide. The mercury ascends steady for a few days, then falls again, and this is repeated, again and again, until the 1st June, by which time the weather becomes too warm to be beneficial to the invalid, while at the North it is usually sufficiently settled to admit of the patient's return home. It is important that the invalid should be forewarned that these hot days of spring are certain to be followed by pleasanter weather at Aiken, and that by a premature return North he may expose himself to the disastrous effects of the spring storms, which prevail there during the month of May, and perhaps lose in one week all he has gained during his residence South. We frequently ask our patients, on their arrival in Aiken, how long they intend to remain, and almost always receive for a reply the statement that the physician at home has told them not to think of returning before the 1st of June. Few, however, have the courage to resist the longing of the home-sick heart, and the first approach of warm weather is eagerly seized upon as an excuse for curtailing their visit. Scores of them start as early as April, and by the middle of May the Southern resorts are comparatively empty. The injudicious an-

nouncement by friends at home, that the spring there is remarkably early, as was the case during the present year, hastened the departure of hundreds, who, after reaching home, were exposed to weeks of inclement weather.

CONCLUSION.

We have endeavored to give an elaborate account of the Aiken climate, treating of each factor separately, and dwelling longer on meteorological phenomena than many may find necessary. To those we would say that few American practitioners have studied climatology, and that to them the rather tedious details about temperature, rain-fall, etc., were necessary to enable them to more fully understand the value of these factors in the treatment of disease.

The advantages of Aiken as a winter resort may be briefly summed up as follows :

1. A dry, bracing climate, with an abundance of bright sunshine.
2. The entire absence of malaria.
3. Better hotels and boarding-houses than are usually met with at Southern resorts, with good food and excellent attendance.
4. The ease and comfort with which it is reached, parlor and sleeping cars running through from New York in less than thirty-five hours.

